

California Environmental Protection Agency



# **Air Resources Board**



## **Station Grant Solicitation Concepts November 19 & 20, 2008**

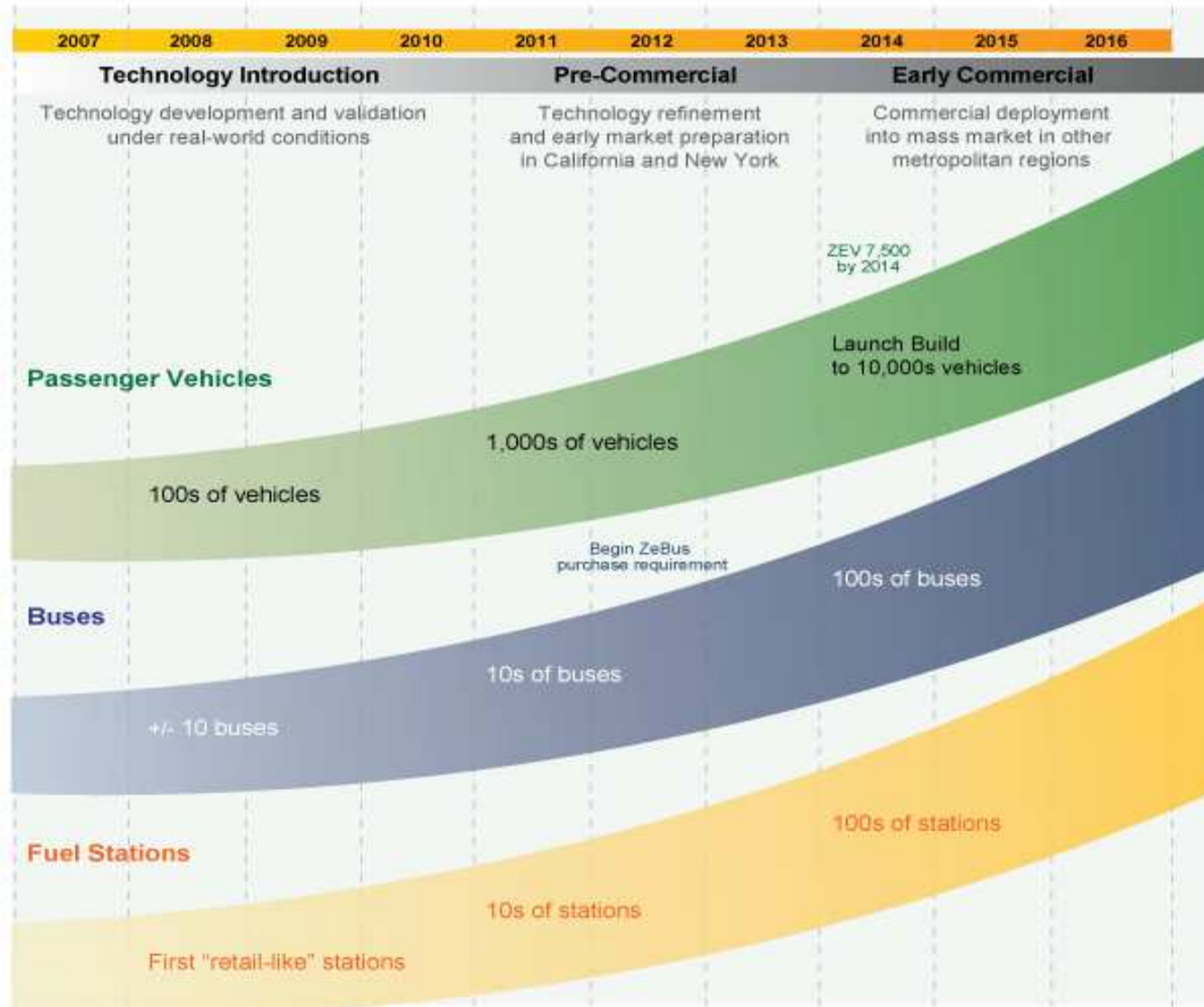
Michael J. Kashuba

# California's Approach to Hydrogen Infrastructure

- L. A. Area, S.F Bay Area, Sacramento
  - Targeted clusters of stations in neighborhoods
  - Match throughput to expected vehicle numbers
  - Goal – move towards retail experience as soon as possible
- Follow OEM FCV Commercialization Concept
  - Technology development – 10s to 100 FCV
  - Production Development – hundreds of FCV
  - Pre commercialization – thousands of FCV
  - Early Commercialization – tens of thousands of FCV



# Fuel Cell Vehicle/Station Rollout Concept

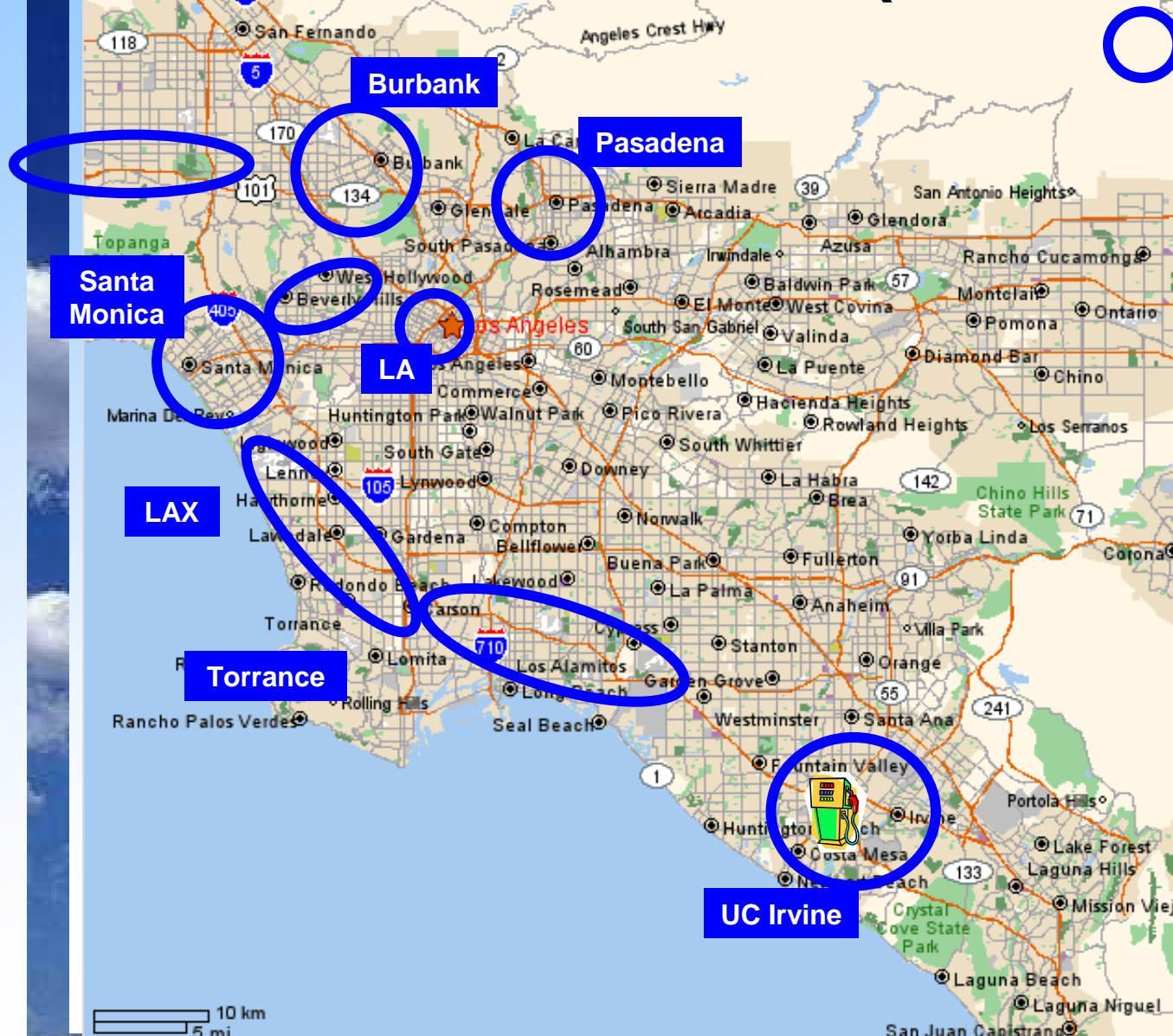


# June 2008 \$7.6 Million Station Funding

- Cal State University Los Angeles
  - 33.3% renewable electrolysis (20 kg/day renewable)
  - Very strong education/college curriculum component
- Alameda-Contra Costa County Transportation District - Emeryville, CA
  - 100% renewable electrolysis (60kg/day renewables)
  - Integrates light duty vehicle and transit buses
- Air Products and Chemicals Inc. - Fountain Valley, CA
  - 100% renewable from waste water digester gas (100kg/day renewables)
  - Produces electricity and H<sub>2</sub> motor vehicle fuel
- Partners, U.S. Department of Energy, South Coast Air Quality Management District, Bay Area Air Quality Management District



# Southern California (2010-2012)



High Priority Areas

- Beverly Hills, Century City, West Los Angeles
- Encino, Sherman Oaks, San Fernando
- Torrance and South Long Beach
- Pasadena
- S. Orange Co.





# Team Qualifications

- Operator w/experience dispensing gaseous fuels
- Major equipment supplier
- Real estate ownership/access clearly secured
- System integrator
- Engineering licenses, certifications, etc.
- Example teams
  - Traditional energy suppliers – Shell, Chevron, BP, Conoco/Phillips
  - Independents & Emerging alt fuels – Biodiesel, E-85, Pearson, DMC, Tosoro, etc.
  - CNG suppliers – Clean Energy, Trillium, etc.
  - Other Retail – Safeway, Costco, Walmart, etc.
  - Hydrogen Suppliers – Air Products, Linde, Air Liquide, et
  - Utilities, Universities - SMUD, SCE, OCSD, CSULA



# ~\$7 Million Co-Funding Available

- Goal - 3 to 4 new modular stations
- One year to install and commission
- 70/30 state/team funding split
  - \$1.4 million average for non-renewable station
  - \$2.3 million average for renewable station
- Operate and maintain 3 years
- May change location after two years
- State interested in intellectual information = data
- Equipment reverts to supplier/operator unless otherwise stated
- Modular skid/ISO box or transportable fueler
- Potentially upgradable to higher capacity



# Draft - Key Action Dates

- Grant Release Dec 2008
- Questions Due Jan 2009
- Answers posted Jan 2009
- Draft GREET Due Feb 2009
- Proposals Due Mar 2009
- Intent to Award Mar 2009
- Grants Processed April 2009
- Station Operable June 2010





# Costs Qualifying for Co-Funding

- Labor
  - Project management, engineering, etc.
- Site Preparation
- Capital equipment
- Operations & maintenance
- Real estate allowance
- Insurance/Indemnification coverage



# Minimum Performance Parameters

- 40kg/day, 7 days a week dispensing capability
- Dispense 35 and 70 MPa hydrogen
- Maximum first 5 kg fill time 5 ~ 8 minutes
- Maximum 3 consecutive fills in 30 minutes
- Pre-cooling likely required
- Ability to perform IRDA and non-communication fill
- Personal identification number access
- No secondary grounding required, but available
- OEM Vehicle pledges



# Operational Parameters

- “Retail Like” setting
  - Public, open access station
  - Well Lit – non-industrial setting
  - Easy ingress and egress
  - Convenient to major thoroughfares and freeways
  - 6 AM – 10 PM hours of operation
  - Attendant not required but available w/notice
  - Menu driven dispenser mounted fueling prompts
  - Station operation status
    - On/off line, pressure & volume available
  - Convenient pay and approval process
  - No PPE required



# Competitive Scoring Matrix

- Strength/experience/team qualifications
- Dispensing times and recovery rates
- Written proposal completeness
- Site plan and engineering drawings
- Location/distance to likely fleets/nearest H2 station
- Construction costs
- Construction schedule
- Dispensing capacity kg/day
- Renewable or non-renewable fuel
- Community/permitting outreach
- Education outreach
- Retail experience/co-located with other fuels



# Standards and Specifications

- Release version A
- TIR 2719
  - Hydrogen Quality Guideline Standard for FC and ICEVs
- JSAE 2601
  - 70 MPa fast fill fueling protocols temperatures and flow rates
- CSA 4.1 70 MPa Station Dispensers
- SAE J2600
  - Refueling connection device geometries for different pressures
- SAE J2799
  - 70 MPa fueling connection device & optional vehicle-to-station communications



# Environmental Requirements

- 50% decrease in criteria pollutants ROG+NOx WTT
- No increase in toxics
- 30% reduction in GHG emissions
- SB 1505 - 33.3% Renewable hydrogen - optional
- GREET Model = **G**reenhouse Gases, **R**egulated **E**missions and **E**nergy Use in **T**ransportation
  - Submit worksheet
- Delivered gas, liquid, on-site production, pipeline as long as meets GREET





# Permits & Certifications

- United Laboratories Listing
- Society of Automotive Engineers
- National Fire Prevention Association
- OSHA
- Department of Transportation
- Department of Energy
- California Environmental Quality Act
- National Electric Code



# Partnerships

- South Coast AQMD
  - Co-funding, permitting
- Department of Energy
  - Permitting and reporting templates
- California Dept. of Food and Agriculture
  - Division of Measurement Standards
  - Nozzle and dispensing certification
- CaFCP
  - Fueling training, station status, etc.



# Proposal Letters and Attachments

- OEM commitment letters
- Proposal team references
- Project plan with payment/milestones
- GREET inputs worksheet
- Budget submittal breakdown
- Major funding/partners list
- Meeting/reporting requirements



# Questions/Comments Requested by December 5, 2008

**Michael J. Kashuba**

Staff Air Pollution Specialist

Zero Emission Vehicle Infrastructure Section

Sustainable Transportation Technology Branch

Mobile Source Control Division

California Air Resources Board

[mkashuba@arb.ca.gov](mailto:mkashuba@arb.ca.gov)

916-323-5123

